B. TYPHOON BILLIE (12-18 JULY 1959)

As early as 090000Z, a reconnaissance aircraft was dispatched to investigate a suspect area between the islands of Yap and Koror. However, it was not until 120000Z that a closed surface circulation was confirmed, and at that time a tropical depression warning was issued by JTWC. Within six hours Tropical Depression BILLIE reached tropical storm intensity and twenty-four hours later, at 130600Z, BILLIE was a full-blown typhoon with winds of 65 knots near the center.

From the beginning, BILLIE moved in a northwesterly direction at an average speed of 11 knots. She reached her maximum intensity at 14-0200Z when surface winds of 100 knots were observed. Later, at 150900Z, reconnaissance aircraft located Typhoon BILLIE approximately 20 miles off the northern tip of Taiwan. She continued to travel in a northwesterly direction and passed inland over the China Mainland at 16-0000Z, at which time JTWC issued a final warning pending recurvature. Orographic effect took its toll and BILLIE gradually degenerated to a tropical storm, curving abruptly northward. Tracking from land data indicated that BILLIE would enter the Yellow Sea at approximately 32N - 122E. JTWC resumed warnings at 170000Z. The storm center rapidly accelerated and moved through North Korea heading for Vladivostok. By 171800Z cold air advection in connection with a polar front rapidly caused BILLIE to become extra-tropical and the final warning was issued.

Typhoon BILLIE's movement followed a decided minor sine wave from inception until near the Chinese coast. Elliptical center reports suggested eccentric movement. Originally, BILLIE was forecast to re-

curve and remain over the open water east of the China coast. However, westward intensification of the subtropical high aloft caused BILLIE to move farther west than forecast, and onto the China coast near 27 degrees north. Marked northward recurvature over the Mainland of China is believed to have been caused by a combination of the orographic effect of the mountains of east-central China and a weak trough over Manchuria. No major forecasting difficulties were encountered and the 24-hour forecast error remained well below the annual average. In general BILLIE followed July seasonal climatology quite well in movement and speed. Twenty-two warnings were issued covering a period of 6 days.

For damage caused by Typhoon BILLIE see Section VI, "Destructive Effects of Typhoons."

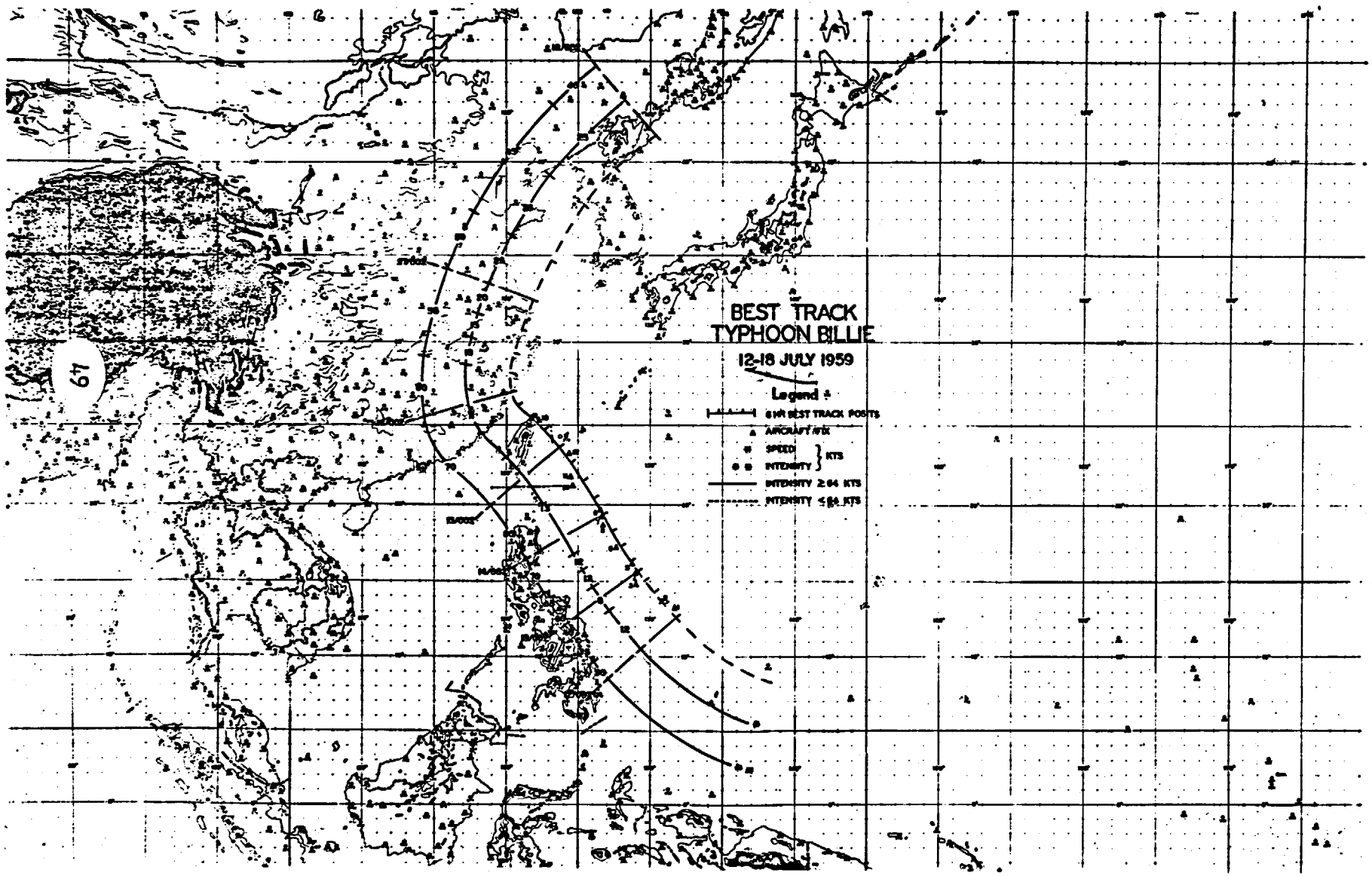
RECONNAISSANCE AIRCRAFT FIXES - TYPHOON BILLIE

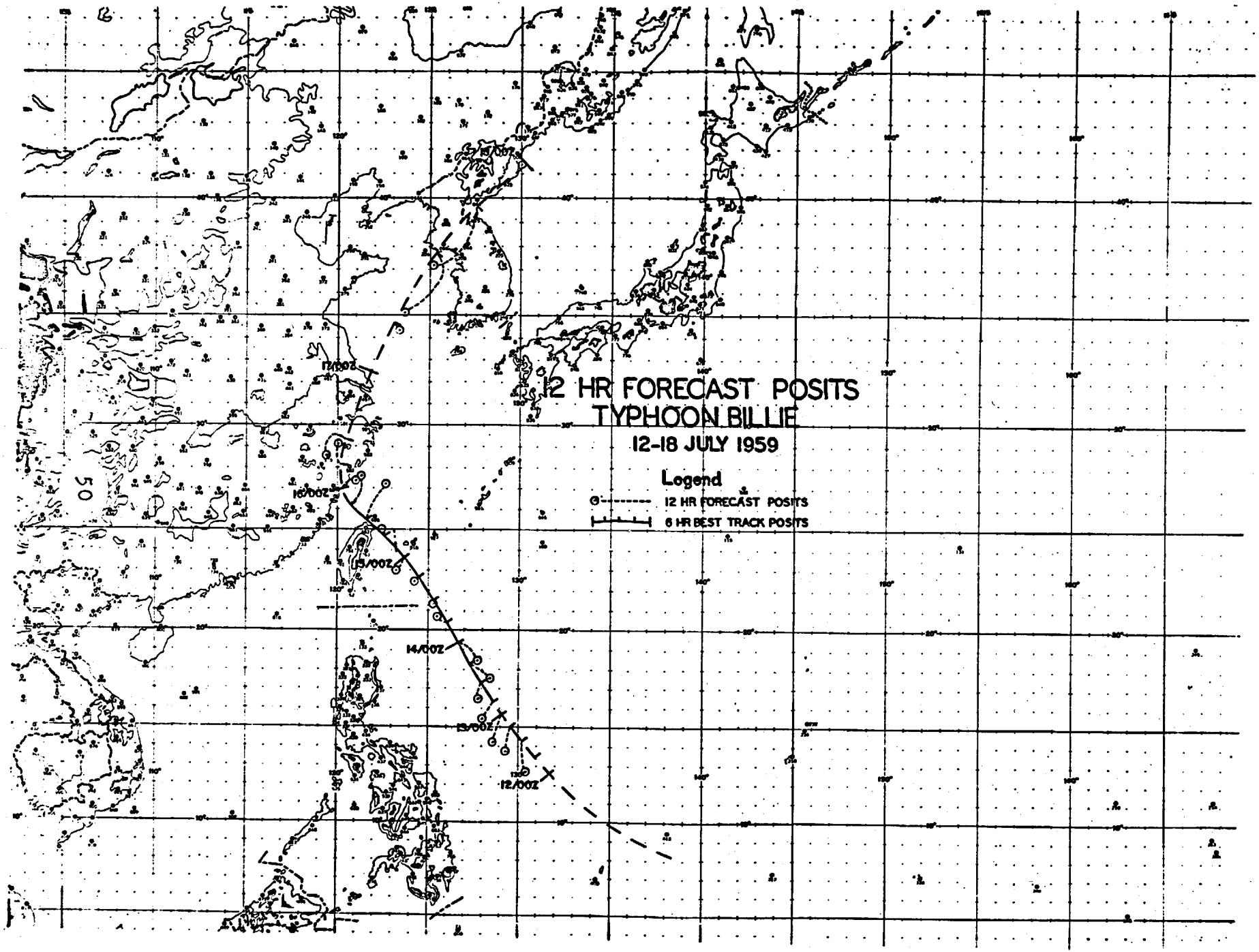
FIX NO.	TIME	LAT.	LONG.	*UNIT METHOD & ACCY	MIN SLP MBS	MAX SFC WND	MIN 700MB HGT	MAX FLT LVL WND	700MB TEMP (°C)	700MB DEWPT (°C)	EYE CHARACTERISTICS
1	120316Z	13.2N	131.8E	54-P-20	997	40	9990	- -	26	21	CIRC DIA 100 MI
2	120700Z	13.7N	130.9E	54-P-15	996	35	- -	- -	27	21	CIRC DIA 30 MI
3	122155Z	14.9N	129.0E	54-P-5	984	45	9830	45	- -	- -	CIRC DIA 40 MI
4	130130Z	15.5N	129.0E	54-P-5	- -	70	9750	60	13	09	CIRC DIA 60 MI
5	130600Z	16.1N	128.9E	54-P-5	984	75	9680	60	18	11	CIRC DIA 20 MI
6	131400Z	17.2N	127.7E	54-R-25	- -	--	- -	- -	- -	- -	CIRC DIA 30 MI
7	132100Z	19.2N	126.7E	54-P-5	974	65	9560	40	15	09	ELLIP 100X75 MI
8	132305Z	18.8N	126.8E	12-R-20	- -	- -	- -	- -	- -	- -	CIRC DIA 30 MI
9	140200Z	19.6N	126.4E	54-P-10	979	100	9560	60	13	12	EYE INDEFINITE
10	141000Z	21.2N	124.6E	12-R-10	- -	- -	- -	- -	- -	- -	
11	141400Z	21.9N	124.4E	54-T-5	- -	- -	- -	58	- -	- -	CIRC DIA 40 MI
12	142100Z	23.2N	124.3E	54-P-5	968	65	9360	85	16	13	CIRC DIA 30 MI
13	150900Z	25.2N	122.2E	54-P-5	969	70	9270	65	15	14	CIRC DIA 25 MI
14	151400Z	25.4N	121.8E	54-R-30	- -	- -	- -	- -	- -	- -	EYE INDEFINITE

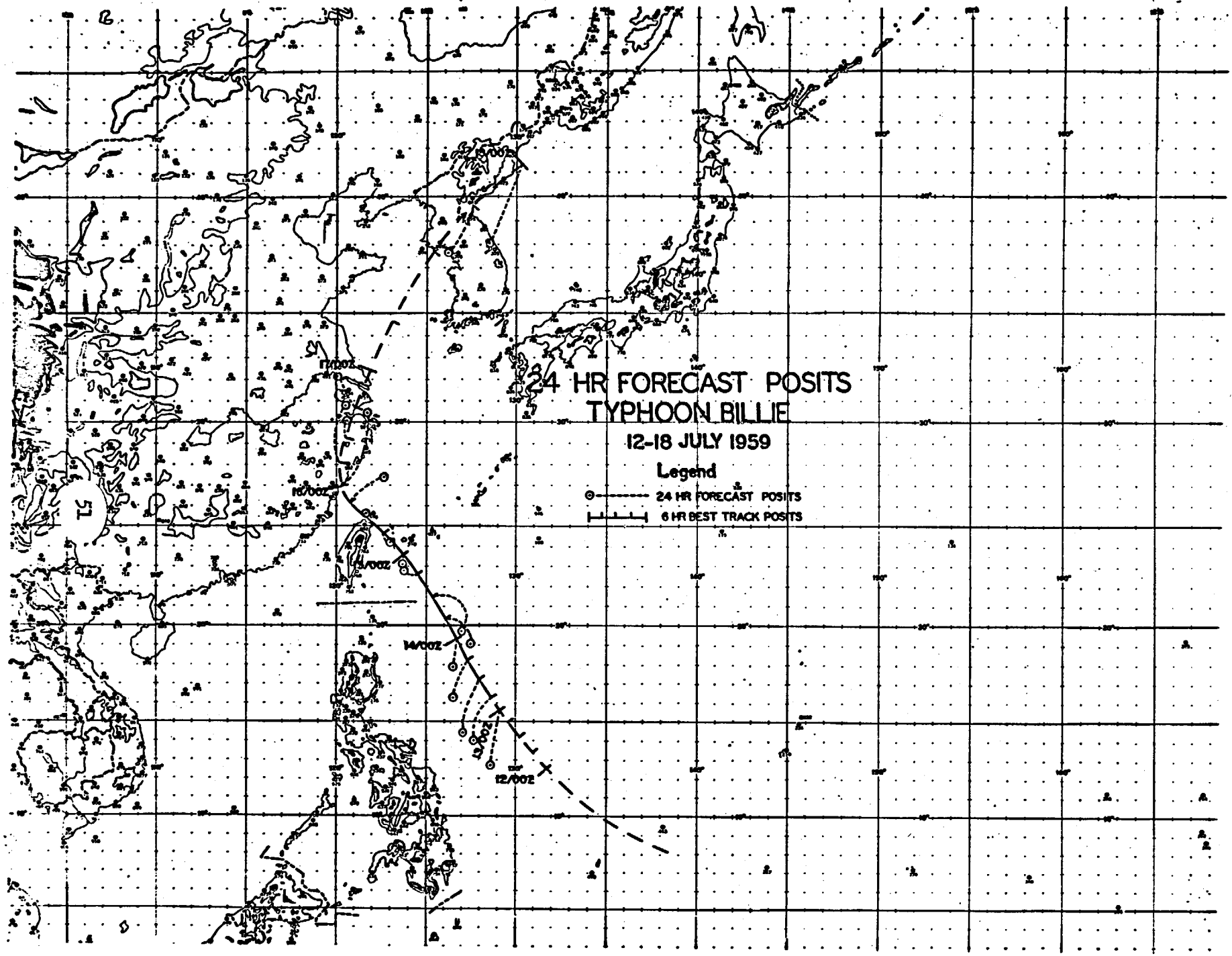
TYPHOON BILLIE 12 - 17 JULY 1959
POSITION AND FORECAST VERIFICATION DATA

DTG	STORM POSITION LAT.	LONG.	12 HR ERROR DEG.	DISTANCE	24 HR ERROR DEG.	DISTANCE
120000Z	12.6N	131.7E	- - - -		- - - -	
120600Z	13.4N	130.8E	- - - -		- - - -	
121200Z	14.2N	130.2E	- - - -		- - - -	
121800Z	15.0N	129.6E	185	71	- - - -	
130000Z	15.7N	129.1E	196	98	- - - -	
130600Z	16.3N	128.6E	211	66	198	145
131200Z	17.2N	128.0E	188	40	200	170
131800Z	18.2N	127.2E	121	71	201	125
140000Z	19.2N	126.5E	130	85	180	80
140600Z	20.3N	125.9E	326	33	145	172
141200Z	21.5N	125.2E	180	20	137	146
141800Z	22.7N	124.5E	243	20	304	38
150000Z	23.7N	123.7E	239	33	173	38
150600Z	24.7N	122.7E	065	41	152	32
151200Z	25.4N	121.8E	025	171	280	08
151800Z	26.1N	120.9E	012	92	052	115
160000Z	27.0N	120.2E	072	50	021	210
160600Z	28.1N	120.1E	355	58	007	167
161200Z	29.3N	120.5E	239	76	023	46
161800Z	30.7N	121.2E	- - - -		325	104
170000Z	32.4N	122.2E	- - - -		- - - -	
170600Z	34.7N	123.5E	- - - -		- - - -	

AVERAGE 12 HOUR FORECAST ERROR 64.1 NM
AVERAGE 24 HOUR FORECAST ERROR 106.4 NM


BEST TRACK
TYPHOON BILLIE
12-18 JULY 1959
Legend :
6HR BEST TRACK POSITS
AIRCRAFT FIX
SPEED
INTENSITY
KTS
INTENSITY ≥ 64 KTS
INTENSITY ≤ 64 KTS
67


12 HR FORECAST POSITS
TYPHOON BILLIE
12-18 JULY 1959
Legend
12 HR FORECAST POSITS
6 HR BEST TRACK POSITS
17/00Z
16/00Z
15/00Z
14/00Z
13/00Z
12/00Z
50


24 HR FORECAST POSITS
TYPHOON BILLIE
12-18 JULY 1959
Legend
24 HR FORECAST POSITS
6 HR BEST TRACK POSITS
17/00Z
16/00Z
15/00Z
14/00Z
13/00Z
12/00Z
15